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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,904

01/16/2007

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200400048

8936

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04/28/2011

EXAMINER

FORD, JOHN K

ART UNIT

PAPER NUMBER

3784

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,904	<b>Applicant(s)</b> DOH ET AL.	
	<b>Examiner</b> John K. Ford	<b>Art Unit</b> 3784	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 16-29,37,38 and 40 is/are pending in the application.
- 4a) Of the above claim(s) 21-24 and 26-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-20,25,37,38 and 40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Applicant's response of February 8, 2011 has been studied carefully. Applicant's election of Group II, claims 16-20, 25, 37, 38 and 40, without traverse, is acknowledged. Applicant's elections of the following species, also without traverse, are acknowledged:

Housing: Third species wherein the tubes are potted and fused to opposite ends of the housing (claims 16, 18 and 20 deemed readable),

. Tube: Co-extruded tubes (claims 16, 18 and 20 deemed readable),

Groove/channel: second species of Figure 2B (claim 38 deemed readable) and

Apparatus: third species of Figure 6 (claim 25 deemed readable).

In the rejections that follow the examiner makes reference to three WO publications. To aid in reading the examiner cross-references the corresponding US patents.

WO 03/029744 (Doh) is equivalent to USP 7,308,932.

USP 6,663,745 (Cheng II) is equivalent to WO 00/44480.

USP 6,582,496 (Cheng I) is equivalent to WO 00/44479.

Note copies of WO 00/44480 and WO 00/44479 are not being provided with this action because of their US equivalency and because applicants, their legal representatives and/or the assignees are already in possession of them. If necessary,

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the WO '479 and '480 publications are relied upon only for their earlier publication dates.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16, 17, 18, 19, 20, 37 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of any one of Doh (WO 03/029744) or Cheng I (USP 6,582,496 or WO 00/44479) or Cheng II (USP 6,663,745 or WO 00/44480) and Cesaroni (USP 6,149,422) and the Solvay Solexis publication entitled "Hyflon MFA and PFA Design Guide" (Copyright 2002).

Doh, Cheng I and Cheng II disclose essentially the same process of fusion bonding potted hollow fibers into a housing. For purposes of discussion here, Doh is discussed exclusively with the understanding that essentially the same disclosure can be found in Cheng I or Cheng II. Given applicants' familiarity with Cheng I and Cheng II as well as with Doh, no further discussion of the references to Cheng I and Cheng II is deemed necessary.

As disclosed in the “Examples” in Doh (beginning on page 15) the small tubes (on the order of 0.05 inches) can be made of MFA (Examples 1-3 and 7 in Doh) or PFA (Examples 4-6 in Doh). The housing, confusingly called a “tube” in Doh (on the order of 1 inch or more) is made of a “previously heat treated and MFA coated PFA tube” (see WO 03/029744, page 13, line 14). Thus, the large PFA tube in Doh was known to be heat treated and coated with MFA. While Doh does not state exactly why the PFA tube was coated with MFA, it stands to reason that this was done to improve bonding between the MFA potting resin (discussed below) and the PFA tubular housing since PFA has a higher melting point (300-310 degrees C) than the melting point of MFA (280-290 degrees C) as evidenced by the Solvay Solexis publication entitled “Hyflon MFA and PFA Design Guide” (Copyright 2002).

In Doh, the small tubes (either PFA or MFA) were potted with MFA resin and fused by heating for 40 hours at 275 degrees C to the housing. The small tubes (made of either MFA or PFA) in Doh were not coextruded.

Cesaroni teaches in column 2, lines 57-62:

“In [a] still further embodiment, the tube is coated with an adhesive to promote adhesion to the polymer of the article and/or said tube is a coextruded tube with the outer layer promoting bonding of said tube to the polymer of the article.

In a further embodiment, the article is part of a header or manifold for a plastic heat exchanger.”

Armed with the teaching of Cesaroni, one of ordinary skill in the relevant art, at the time the invention was made, would have found it obvious to have coextruded the small PFA tubes in Doh (see Examples 4-6) with an outer layer of MFA to improve bonding of the small PFA tubes to the MFA potting resin that ultimately is cured to form the two header plates of the Doh heat exchanger. In this regard, Cesaroni explicitly teaches an art recognized equivalence of coating a tube with an adhesive and coextruding a tube with an adhesive and Doh teaches a PFA tube was known to be heat treated and coated with MFA (Doh, page 13, line 14). While Doh does not state exactly why the PFA tube was coated with MFA, it stands to reason that this was done to improve bonding between the MFA potting resin and the PFA tube since PFA has a higher melting point (300-310 degrees C) than the melting point of MFA (280-290 degrees C). Coextrusion (as disclosed by Cesaroni) has advantages over coatings (as disclosed by Doh) such as fewer concerns about uniformity caused by clogging of spray equipment where spray equipment is used to apply the coating.

Regarding claims 18 and 37, the structure above is made by the same process that applicant has disclosed, the only difference being that the small tubes are coextruded of two plastic fluorocarbon materials rather than being made of one plastic fluorocarbon material. In the absence of any test evidence to the contrary, it stands to reason that the structure above would have these claimed properties inherently since the prior art process of making a heat exchanger of one plastic fluorocarbon material is

identical to the process of making a heat exchanger of two coextruded plastic fluorocarbon materials.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of any one of Doh or Cheng I or Cheng II and Cesaroni (USP 6,149,422) and the Solvay Solexis publication entitled "Hyflon MFA and PFA Design Guide" (Copyright 2002) as applied to claim 16 above, and further in view of WO 03/029775.

To have used the heat exchanger deemed obvious in the rejection of claim 16 above in place of heat exchanger 50 in Figure 1 of WO 03/029775 would have been obvious to one of ordinary skill in the art to advantageously condition high temperature, corrosive and oxidizing process fluids without significant degradation of the heat exchanger.

Claim 18, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of any one of Doh or Cheng I or Cheng II and Cesaroni (USP 6,149,422) and the Solvay Solexis publication entitled "Hyflon MFA and PFA Design Guide" (Copyright 2002) as applied to claim 18 and 37 above, and further in view of the JP 5-49875 and the translation (received 9/28/10) thereof provided by applicant.

Regarding claim 38, Figures 1 and 2 of JP '875 show circumferential grooves (1-1) in a housing of a plastic heat exchanger to advantageously anchor the resin that forms the header plate of the heat exchanger to the wall of the housing. To have added this feature to heat exchanger deemed obvious in the above rejection of claims 18 and 37 would have been obvious to one of ordinary skill in the art to advantageously make the heat exchanger more pressure resistant and mitigate the problem of "curing shrinkage" discussed in JP '875.

Regarding claims 18 and 37, the heat exchanger of JP '875 tested, under similar temperatures and pressures as are claimed in claims 18 and 37, in positive fashion (i.e. it did not fail). Again, there is reason to believe, in the absence of any test evidence to the contrary, that the structure deemed obvious above would have these claimed properties inherently since the JP '875 has been tested under similar conditions and found to be satisfactory. Basically, it is the examiner's considered opinion that these performance criteria would have been obvious to have met simply by choosing to put enough resin and enough grooves in the prior art structure to assure no failure even at the highest temperatures, pressures and cycle times.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John K. Ford whose telephone number is 571-272-4911. The examiner can normally be reached on Mon.-Fri. 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John K. Ford/  
Primary Examiner, Art Unit 3784